A METHOD AND SYSTEM FOR OBJECT TRACKING

FIELD OF THE INVENTION

The present invention relates to a unique object identifier operatively coupled to an object and a system for monitoring and storing information related to that object in a database. More particularly, the present invention relates to a radio frequency identifier (RFID) tag for mounting on a tire and a system and method for monitoring the life of that tire.

BACKGROUND OF THE INVENTION

With hundreds of millions of tires being produced annually by the tire industry, tracking an individual tire throughout its entire life becomes a challenge. In addition to that challenge, there is a need to track different kinds of information related to tires. This information can be generally divided into two categories: 1) the information associated with the performance of tires while they are operating on a vehicle, i.e., pressure, temperature, mileage, tread depth, tire failures, retreadings, and warranty expirations, and 2) the information associated with servicing the tires in a garage, i.e., repairs, rotations, etc. There is a need to provide cradle-to-grave tire tracking and management of tire-related information.

Whether a tire manufacturing company or a tire service center, combined knowledge of both tire performance and servicing information can be invaluable to them. In the past, it has been impossible to track both sets of information. Manufacturing companies, for example, are unable to track their tires after they are sold to distributors. This is because distributors may install a set of tires on one vehicle and then, over the course of each tires' life, the tires may

be rotated on a vehicle or at a later date installed on another vehicle. As there is no system that enables companies to determine the location and performance of their tires, there is a need for a solution to this dilemma.

This is also a significant problem in cases where a production batch of tires is determined to be defective after distribution into the marketplace. It would be impossible to contact each owner of defective tires to ensure a complete "recall" of the defective product. Accordingly, this type of tire tracking information is invaluable to manufacturers.

Field performance information for a tire can also be invaluable to tire manufacturing companies. That information would allow manufacturers to do performance analysis on their tires based on "in the field" performance information and make modifications to their tire if defects are found.

In view of the aforementioned shortcomings, there is a need to provide an industry-wide solution that tracks the location, performance, and servicing of a tire.

SUMMARY OF INVENTION

The present invention provides a system and a method for tracking an object, such as a tire or a vehicle, during its operative life, from its manufacture to its disposal. According to the present invention, each object is assigned a unique object identifier. The unique object identifier is stored on a unique object identifier medium, such as a radio frequency identifier (RFID) tag, that is operatively coupled to an object. The system of the present invention includes a system database for storing performance and service information related to each object. A processor, operatively coupled to the system database, manages the retrieval,

storage, and distribution of performance and service information between the database and a number of service providers.

The service providers are in communication with the processor from a remote site via wireless communication, for example. A service provider may be a garage or a dealership that installs and repairs tires. According to the present invention, the service provider is registered with the system processor and is assigned a unique identifier. Each service provider is provided with a device that enables them to read and write information to and from the unique object identifier medium. When reading information from that medium, the service provider will be able to identify the "tombstone" information associated with that object based on the unique object identifier stored on the medium. For tires, the "tombstone" information may include information on the manufacturer, the model, and the year. This information is helpful to the service provider when determining how to service the tire. In addition, the service provider generates performance information stored in the system database for a complete overview of the tire. After servicing the tire for example, the service provider uses the device to write servicing information onto the medium or alternatively forwards that servicing information to the system database. The service provider may also generate additional performance information for storage by testing or measuring object-related performance characteristics. This newly generated performance information can then also be written by the service provider onto the medium. According to the present invention, the system database becomes a resource for information related to the performance and servicing of an object, such as a tire.

While the present invention is discussed with reference to tires, it is envisaged that the tracking of other manufactured components would be possible through use of the system and method of the present invention. Furthermore, it will likely be readily apparent to a skilled artisan how object tracking through use of the present invention may be applied to various fields of manufacture.

In a preferred embodiment, the present ivention provides a Tire Unique Identifier (TUID) using an RFID tag as the medium for storing a tire identifier.

In a first aspect, the present invention provides a system for tracking an object during its operative life, the object being assigned an identifier stored on a medium operatively mounted to the object, the system comprising:

at least one means, at a service provider, for writing service information to the medium, the service information characterized by at least one service operation on the object;

at least one means, at a service provider, for reading service information from the medium;

means for generating performance information characterized by at least one object-related performance characteristic;

a system database having means for storing, in association with the object through the identifier, the performance information on the medium, the performance information being, and having means for storing, in association with the object through the identifier, the service information on the medium; and

a processor, operatively coupled to the database, having means for tracking the object, associated with the identifier, and having means for managing the service information and the

performance information associated with the object through the identifier;

wherein the at least one means for reading and the at least one means for writing are in communication with the processor.

In a second aspect, the present invention provides a method for tracking an object during its operative life, comprising:

a) associating a unique identifier with an object;

b) encoding a medium operatively mounted to the object with the identifier,

c) at a service provider, reading the identifier from the medium;

d) associating performance information with the object through the identifier, the performance information being characterized by at least one object-related performance characteristic;

e) at a service provider, generating service information characterized by at least one service operation on the object;

f) storing the service information and the performance information in a system database in association with the object through the identifier; and

g) monitoring the performance information and the service information stored in the database for object tracking.

In a third aspect, the present invention provides a method of encoding a medium for identifying an object comprising:

a) at a service provider, generating an identifier based on at least one characteristic associated with the object;

b) updating a list of object identifiers, stored at a database accessible at the service provider, to prevent a conflict in the list of object identifiers;

c) writing the identifier to the medium operatively coupled to the object; and

d) registering the object in a central database, associated with the service provider, for monitoring the object using the identifier.

In a fourth aspect, the present invention provides a medium encoded for identifying an object wherein

at least one characteristic encoded therein is selected from the group consisting of: a model of the object, a year of production of the object, a physical characteristic of the object, a service provider for the object, a manufacturer of the object, and an object identifier.

In a fifth aspect, the present invention provides a device for encoding a medium with an object identifier at a service provider, having stored thereon, computer-readable and computer-executable instructions which, when executed by a processor, cause the processor to perform steps comprising:

a) generating an identifier based on at least one characteristic associated with the object;

b) updating a list of object identifiers, stored at a database accessible at the service provider, to prevent a conflict in the list of object identifiers;

c) writing the identifier to the medium operatively coupled to the object; and

d) registering the object in a central database, associated with the service provider, for monitoring the object using the identifier.

In a sixth aspect, the present invention provides a database for tracking an object during its operative life, the object being assigned an identifier stored on a medium operatively mounted to the object, the database being constructed and arranged for use with at least one means, at a service provider, for writing service information to the medium and for use by a processor, the service information characterized by at least one service operation on the object, for use with at least one means, at a service provider, for reading service information from the medium, and for use with a processor, operatively coupled to the database, having means for managing the service information and the performance information associated with the object through the identifier, and having means for tracking the object using the service information and the performance information, the database comprising:

means for generating performance information and for storing, in association with the object through the identifier, the performance information on the medium, the performance information being characterized by at least one object-related performance characteristic, and

means for storing, in association with the object through the identifier, the service information on the medium.

In a seventh aspect, the present invention provides a processor for tracking an object during its operative life, the object being assigned an identifier stored on a medium operatively mounted to the object, the processor for use with at least one means, at a service provider, for writing service information to the medium, the service information characterized by at least one service operation on the object, for use with at least one means, at a service provider, for reading service information from the medium, and for use with

a system database having means for generating performance information and for storing, in association with the object through the identifier, the performance information on the medium, the performance information being characterized by at least one object-related performance characteristic, and having means for storing, in association with the object through the identifier, the service information on the medium, the processor comprising:

means for managing the service information and the performance information associated with the object through the identifier; and

means for tracking the object using the service information and the performance information;

wherein the at least one means for reading and the at least one means for writing are in communication with the processor.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described with reference to the Drawings in which:

FIGURE 1 is a TUID having 96 bits grouped by 4's into hex blocks according to the present invention;

FIGURE 2 illustrates 96 bits represented by 24 hex blocks according to the present invention;

FIGURE 3 illustrates the formatting of a TUID according to the present invention;

FIGURE 4 is a TUID highlighting the year section hex block according to the present invention;

FIGURE 5 shows year section hex blocks for a 2004 vehicle TUID, for example, according to the present invention;

FIGURE 6 is a TUID highlighting the tire manufacturer section hex blocks according to the present invention;

FIGURE 7 is a tire manufacturer section for a tire manufacturer ID C3A1, for example, according to the present invention;

FIGURE 8 is a TUID highlighting the tire description section hex blocks according to the present invention;

FIGURE 9 is a tire description section for tire description ID 52FD, for example, according to the present invention;

FIGURE 10 is a TUID highlighting the service provider section hex blocks according to the present invention;

FIGURE 11 is a service provider section showing service provider ID A90F271, for example, according to the present invention;

FIGURE 12 is a TUID highlighting the tire identifier section hex blocks according to the present invention;

FIGURE 13 is a tire identifier section showing tire identifier 2DB7F, for example, according to the present invention;

FIGURE 14 is a TUID highlighting the check sum section hex blocks, according to the present invention;

FIGURE 15 is a check sum for partial TUID 2DB7FAC930AF125721F0D4 at Decimal 98 converted into hex blocks as 62, for example, according to the present invention;

FIGURE 16 is a TUID having the value 2DB7FAC930AF125721F0D462, for example, according to the present invention;

FIGURE 17 is a flowchart detailing the steps in reading a TUID from an RFID tag and parsing the TUID for particular data according to the present invention;

FIGURE 18 is a flowchart detailing the steps in writing a TUID to an RFID tag according to the present invention;

FIGURE 19 is a flowchart detailing the steps in generating the data contained in the TUID according to the present invention;

FIGURE 20 is an asset management database according to the present invention; and

FIGURE 21 is a service provider embodiment according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention will be described for the purposes of illustration only in connection with certain embodiments. However, it is to be understood that other objects and advantages of the present invention will be made apparent by the following description of the drawings according to the present invention. While a preferred embodiment is disclosed, this is not intended to be limiting. Rather, the general principles set forth herein are considered to be merely illustrative of the scope of the present invention and it is to be further understood that numerous changes may be made without straying from the scope of the present invention.

It should be understood that the preferred embodiments mentioned here are merely illustrative of the present invention. Numerous variations in design and use of the present invention may be contemplated in view of the following claims without straying from the intended scope and field of the invention herein disclosed.

While the skilled artisan may contemplate a variety of mediums for storing tire-related information, the present invention is described with reference to the preferred embodiment. The medium of the preferred embodiment discussed throughout the description is a radio frequency identifier (RFID) tag. However, as the skilled artisan would know, mediums such as bar codes, and the like, may be utilized. Accordingly, the present invention is not limited to an RFID tag.

According to the present invention, a tire is uniquely identified by an RFID tag encoding scheme that generates a unique number, referred to as a Tire Unique Identifier (TUID). For exemplary and illustrative purpose, the TUID is a 96-bit number consist of 24 groupings of four bits each. Referring now to **FIGURE 1**, a TUID having 96 bits grouped by 4's into hex blocks is shown. Each of the four bit groupings represent a hexadecimal number and is referred to as a hex block.

FIGURE 2 shows 96 bits represented by 24 hex blocks.

It should be noted that the present invention is also not limited to the use of hexadecimal numbers, as binary or octal numbers would also be suitable.

According to the present invention, a TUID is designed to provide a unique identifier for each vehicle tire throughout the world. A TUID may be sub-divided into 6 sections:

- Year (YR),
- Tire Manufacturer (TM),
- Tire Description (TD),
- Service Provider (SP),
- Tire Identifier (TI), and
- Check Sum (CS)

Each section of the TUID contains one or more hex blocks which are individually located in specific positions in order to add some basic privacy capabilities in addition to preventing fraud and bit manipulation. **FIGURE 3** illustrates the formatting of a TUID according to a preferred embodiment of the present invention. The sectional and positional formatting of a TUID is as depicted in **FIGURE 4**, and each section is discussed below.

Referring to **FIGURE 4**, a TUID highlighting the year section hex blocks is shown. The Year Section consists of two (2) hex blocks and contains the last two digits of the year the tire was installed. Only numerical hexadecimal values (i.e. the numbers 0 to 9) are valid in either hex block, thereby permitting year values between 00 and 99 inclusively. Hex blocks for the Year Section are found in positions **H20** and **H22**, as shown in **FIGURE 4**. For example, if the year of installation were 2004, then the Year Section would be 04, as shown in **FIGURE 5**.

Referring to **FIGURE 6**, a TUID highlighting the tire manufacturer section hex blocks is shown. The Tire Manufacturer Section consists of four (4) hex blocks, found in positions **H7**, **H9**, **H11** and **H13** as shown in **FIGURE 6**, and is

therefore able to uniquely identify up to 65,536 tire manufacturers. Tire manufacturers are required to register for their unique Tire Manufacturer ID, which uniquely identifies their tires anywhere in the world. As an example, **FIGURE 7** shows the tire manufacturer section for a tire manufacturer whose tire manufacturer identification number is C3A1.

Referring to **FIGURE 8**, a TUID highlighting the tire description section hex blocks is shown. The tire description section is four (4) hex blocks long and can be found in positions H15, H17, H19 and H21, as seen in **FIGURE 8**. The tire description section is able to uniquely identify up to 65,536 tire models and descriptions per unique tire manufacturer and is assigned and managed in cooperation with each registered tire manufacturer. **FIGURE 9** shows an example of a TUID highlighting the tire description section's hex blocks, which contains tire description identifier of 52FD.

Referring to **FIGURE 10**, a TUID highlighting the service provider section hex blocks is shown. The Service provider section is seven (7) hex blocks long and is able to uniquely identify up to 268,435,456 service providers. Service providers are dealerships, garages, tire recyclers or any other entities that service tires in some shape or form. Hex blocks for the service provider section are found in positions **H6, H8, H10, H12, H14, H16** and **H18**, as shown in **FIGURE 10**. Service providers register for their unique service provider ID, which uniquely identifies their business across the world. An example of a valid service provider identifier is shown in **FIGURE 11**, which contains the value of A90F271.

Referring to **FIGURE 12**, a TUID highlighting the tire identifier section in hex blocks is shown. The Tire

Identifier section is five (5) hex blocks in length and is able to uniquely identify up to 1,048,576 unique tires from a unique service provider per year. The hex blocks for this section are found in positions **H1**, **H2**, **H3**, **H4** and **H5**, as shown in **FIGURE 12**. The Tire Identifier is a random number between 1 and 1,048,576. This number will be generated by a random number generator seeded using the following formula:

Random Number Generator's Seed Value = ((DAY x SPI) / TMI) x SECOND.

Where

DAY = Day of The Year, where acceptable values are between 1 and 366;

SPI = Service Provider ID, where acceptable values are between 1 and 268,435,456;

TMI = Tire Manufacturer ID, where acceptable values are between 1 and 65,536; and

SECOND = real time's seconds value, where acceptable values are between 1 and 59.

It should be noted that the resulting number may need to be truncated depending on the capabilities of the random number generator algorithm implemented.

FIGURE 13 shows the tire identifier section of the TUID with a tire identifier of 2DB7F.

Referring to **FIGURE 14**, a TUID highlighting the check sum section hex blocks is shown. The Check Sum section is two (2) hex blocks long and is used to provide basic security against fraudulent usage, in addition to providing validation of a

properly encoded TUID. The hex blocks for this section are found in positions **H23** and **H24**, as shown in **FIGURE 14**. The Check Sum is a summation of hex block values within other sections of the TUID using the formula:

Check Sum Value = (H1 + H2 + H3 + H4)

+ (H7 + H8 + H9+ H10)

+ (H13 + H14 + H15 + H16)

+ (H19 + H20 + H21 + H22)

An example of a valid check sum (62) is shown in **FIGURE 15**. **FIGURE 15** shows the check sum for a partial TUID 2DB7FAC930AF125721F0D4, which is 62 when converted into hex blocks.

FIGURE 16 shows a valid TUID having the value 2DB7FAC930AF125721F0D462.

FIGURE 17 is a flowchart detailing the steps taken according to an embodiment of the present invention in reading a TUID from an RFID tag and parsing the TUID for particular data.

Referring to **FIGURE 18**, a flowchart is shown that details the steps taken in writing a TUID to an RFID tag according to an embodiment of the present invention.

FIGURE 19 is a flowchart detailing the steps in generating the data contained in the TUID according to an embodiment of the present invention.

Referring to **FIGURE 20**, an asset management database (AMD) **100** according to the present invention is shown. The AMD **100** stores tombstone data **105a**, **105b**, **105c**, field performance **110** and servicing-related information **115** about tires. It uses

the TUID to tie all of these disparate information sources together in order to uniquely identify each tire within the database, and thereby provide true cradle-to-grave tracking of a tire throughout its life.

Referring to **FIGURE 21**, a service provider embodiment according to another embodiment of the invention is shown. The Service Provider **200** operates within a wireless environment. Through an 802.11b wireless protocol, or some WiFi variation of that protocol, the point/router **205** is connected to the Internet **210** through either an ADSL or cable connection **215**, for example. This access point enables wireless handheld devices **220a**, **220b**, **220c** within the operating environment at the service provider to leverage the power of the Internet, and more specifically, to interact with both the global registration database (GRD) **225** and the asset management database **230** by consuming XML web services.

According to the present invention a read/write RFID tag, an RFID Reader Card and a handheld device are used in order to implement the encoding scheme outlined above. The process for encoding an RFID tag in order to uniquely identify a tire will now be described.

In a hardware implementation, for example, the RFID Reader Card, from a variety of vendors, may be utilized to encode the TUID comprising an RFID tag. The handheld device may also connect to a back-end database portal through a wireless connection.

The initialization of the process occurs at the service provider level. This provides the TUID with the ability to cover all possible tires produced during a given year. A service technician embeds, or mounts, an RFID tag onto the

tire such that the tag will remain there for the life of the tire and cannot be tampered with or sabotaged. The service technician then mounts the tire onto the vehicle, as per any new tire installation. Using an application running on a handheld device with an attached RFID Reader Card, the device then generates a TUID as follows:

i. Year: the current year's last two digits are used automatically.

ii. Tire Manufacturer: the service technician selects from a list of available tire manufacturers.

iii. Tire Description: the service technician selects from a list of available tire models and descriptions associated with the selected Tire Manufacturer ID.

iv. Service Provider: is a fixed number that is available after a Service Provider has registered.

v. Tire Identifier: a random number is generated based on the formula discussed earlier.

In the event of a conflict, the current time's seconds value is added to the number generated. If there is still a conflict with the number generated, the next sequential number available is obtained. The service technician then brings the handheld device to the spot where the RFID tag has been positioned on the inside of the tire and, activates the handheld application to instruct the handheld's RFID reader card to write the TUID through the tire's rubber and into the RFID tag itself. This tire's TUID is then registered in a global database for tire tracking, performance analysis and other purposes.

In order to identify a tire, a service technician reads the TUID from a tire's embedded RFID tag by bringing the handheld device with the RFID Reader Card in communicable distance with the TUID. The service technician then initiates the application to instruct the RFID Reader Card to read the TUID from the embedded RFID tag. The RFID Reader Card then passes this value to the application which then queries the global database for information relating to that TUID, thereby positively identifying the tire. The handhelds are utilized for reading/writing TUIDs by service technicians at a registered service provider.

As discussed previously, the TUID is composed of 6 components: Year; Tire Manufacturer; Tire Description; Service Provider; Tire Identifier; and Check Sum. Of these components, the Tire Manufacturer, the Tire Description and the Service Provider are defined by a global registration authority (GRA) to function efficiently and effectively. The GRA manages the GRD. The GRA determines what identifier (ID) should be assigned, communicates to the tire manufacturer/service provider their ID, and then ensures that the GRD reflects this newly assigned ID.

It should be noted that changes in the GRD may be synchronized and replicated in each handheld device because of a "cached" version of the GRD is stored in each device. To reduce the number of transactions between the GRD and the devices, the information is updated on an intermittent basis. By having a "cached" GRD stored on the handheld device, the application is optimized for TUID generation performance within the servicing environment at the service provider. The updating on a weekly basis, for example, would ensure that the "cached" GRD is accurate and to date, without reducing the performance of the process.

Each tire manufacturer or retreader company, regardless of where they operate within the world, registers with the Global Registration Authority to fully benefit from the system and method of the present invention. Upon completing their registration, the tire company is permanently assigned an identifier, the Tire Manufacturer ID, by the GRA. The assigned Tire Manufacturer ID is then stored within the GRD for reference and archival purposes. There are up to 65,536 identifiers reserved for tire manufacturers and retreaders and their assignment is based on the following rules:

Identifier Range	Reserved For	Within
1 - 1,000	Manufacturers	North America
1,001 - 20,000	Retreaders	
20,001 - 21,000	Manufacturers	Europe
21,001 - 40,000	Retreaders	
40,001 - 41,000	Manufacturers	Asia
41,001 - 60,000	Retreaders	
60,001 - 61,000	Manufacturers	Rest Of World
61,001 - 65,536	Retreaders	

Each model of tire manufactured by a tire manufacturer is registered with the GRA. Upon completing this process, a tire model is permanently assigned an identifier, the Tire Description ID, in association with the appropriate Tire Manufacturer ID by the GRA. The assigned Tire Description ID is then stored within the GRD for reference and archival purposes. There are 65,536 identifiers reserved PER tire manufacturer ID, and these identifiers are assigned sequentially in the order they are registered.

Tire Manufacturer IDs	Tire Descriptions Per Tire Manufacturer ID
65,536	65,536

Each service provider, any organization that works on tires regardless of where they operate within the world, registers with the Global Registration Authority. Upon completing the registration, the service provider is permanently assigned an identifier, the Service Provider ID, by the GRA. The assigned Service Provider ID is stored within the GRD for reference and archival purposes. There are 268,435,456 identifiers reserved for service providers and their assignment is based on the following rules:

Identifier Range	Reserved For
1 - 75,000,000	North America
75,000,001 - 150,000,000	Europe
150,000,001 - 225,000,000	Asia
225,000,001 - 268,435,456	Rest Of World

Within the Service Provider environment, an application responsible for the generation of new TUIDs runs on each wireless handheld. This application is initialized with the Service Provider ID and prompts the user for the tire manufacturer and model of the tire that is about to be installed on a vehicle for the first time. The selected tire manufacturer and model are then translated into their respective Tire Manufacturer ID and Tire Description ID. The remaining sections of the TUID are generated with the unofficial TUID checking for duplicates within the AMD, again through the use of XML Web Services, before becoming finalized. When no conflict is detected, the TUID Generator application creates a new tire record in the Asset Management Database by consuming an XML Web Service and sets this

record's primary key to the finalized TUID. From that point on, the tire is capable of being identified at any time by its TUID. It should be noted that when creating a TUID, it is necessary for the handheld to communicate with both the AMD and the GRD. When simply servicing for example a tire, the handheld may only communicate with the AMD when retrieving information.

When a tire comes in for servicing, the wireless handheld reads the RFID tag, decodes the TUID and, using an XML Web Service, queries the Asset Management Database for all tire-related information pertaining to that TUID, or tire. This can also be accomplished at the vehicle level, where the Vehicle Identification Number (VIN) is scanned in and using a different XML Web Service, queries the Asset Management Database for all TUIDs (tires) that have been associated (mounted) with that vehicle.

On a pre-determined schedule, all wireless handhelds within a service provider use an XML Web Service to query the GRD for any changes to the Tire Manufacturer and Tire Description listings. If there are changes in the Global Registration Database, they are synchronized and replicated back to the handheld device using XML Web Services over the available wireless connection. In this way, the wireless handhelds are ensured to be consistent with the Global Registration Database on a "real-time" basis.

It should be noted that changes in the GRD are not synchronized and replicated in the AMD. The GRD is mostly static, with continuous new additions. The AMD simply references the GRD to decode what the Tire Manufacturer ID,

Tire Description ID, Service Provider ID are. When the GRD changes, the AMD does not necessarily need to be updated until a new ID is used in the generation of a TUID.

For example, the handheld device can communicate with both the AMD and the GRD in order to generate TUIDs. The handheld device communicates with the AMD for retrieving tire information during a servicing. The IDP then pulls information from both databases for display purposes only to assign a name to the object instead of a numerical representation.

It should still further be noted that the communication between global database and the service provider is accomplished by existing communication standards built within the handheld. The handheld communicates to an access point in the Service Provider's environment. This access point has a connection established to the Internet (ADSL, Cable). When the handheld links to the wireless access point, the handheld has access to the Internet. The application running on the handheld can the communicate over this connection (using TCP/IP) to the global asset tracker.

In a further embodiment of the invention, third parties may also access this cradle-to-grave tire data through an Internet Data Portal (IDP) using browser technologies. An IDP provides a detailed and graphical window into the AMD and facilitates the management of tire information through the generation of timely reports, alerts and dynamic querying. Within this environment, the TUID is the enabling technology allowing the efficient and effective searching, retrieving and presentation of data. According to an embodiment of the present invention, access to the GRD may be given to a third party. This would

be useful to a third party in looking at listings of tire manufacturers, tire models, or service providers.

It should be mentioned that the present invention may be used in a servicing application, when the vehicle comes in for servicing. The Vehicle Identification Number (VIN) is scanned and transmitted to the portal and returns any and all relevant information about the tires on the vehicle through use of the the TUID. The relevant information may be recall information.

It should be understood that the preferred embodiments mentioned here are merely illustrative of the present invention. Numerous variations in design and use of the present invention may be contemplated in view of the following claims without straying from the intended scope and field of the invention herein disclosed.